Operator Training

Monthly Operation and Maintenance

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health
and Environmental Control

Each Month at Every Facility, Class B Operators Must Ensure:

- Release detection monitoring is performed
- Release detection and equipment monitoring records have been kept and stored for the next twelve months
- Necessary equipment and system testing has been performed
- Unusual operating conditions or unusual monitoring results have been reported and investigated
- Routine operations and maintenance activities have been accomplished
- Spill, overfill, and corrosion protection systems are in place and operational
- Class C operators have been designated and trained

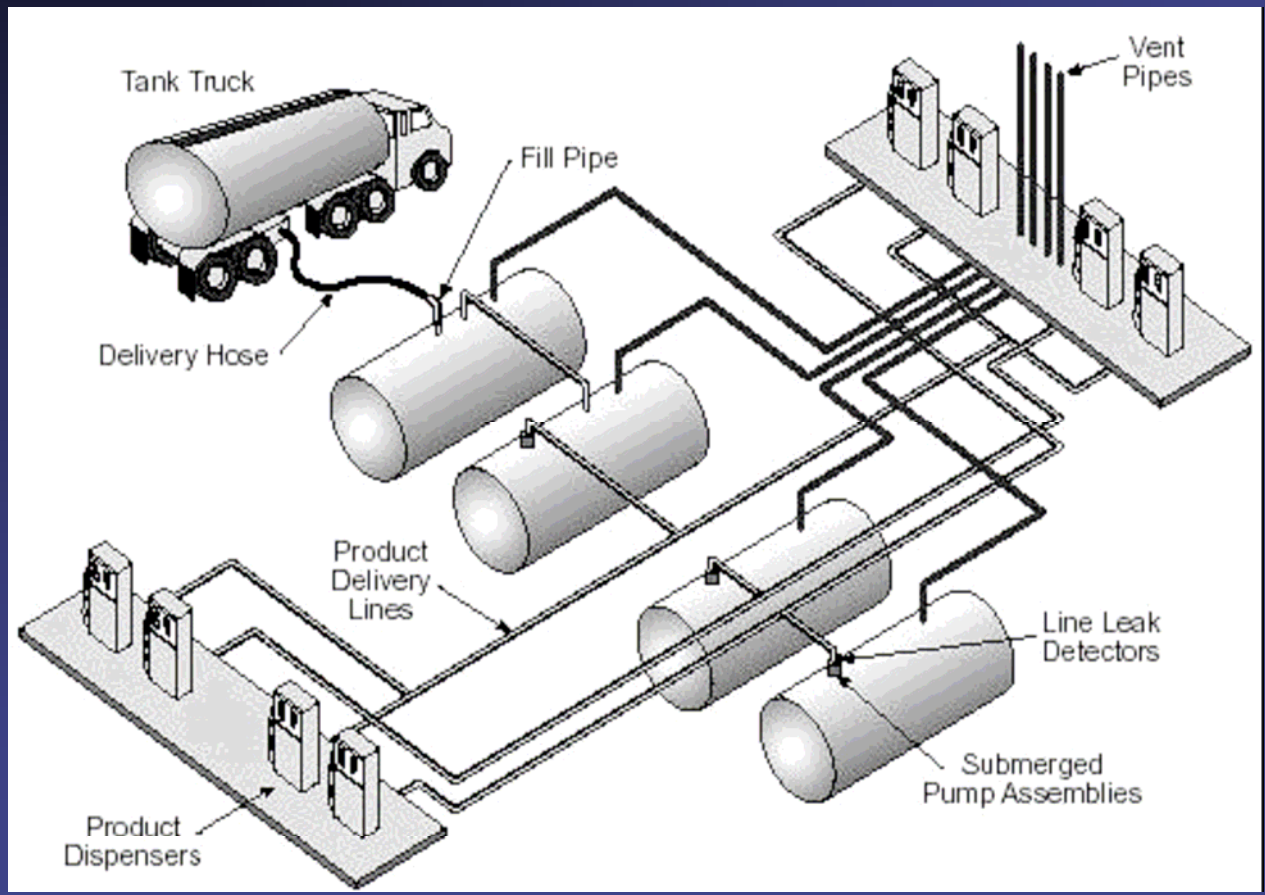
R. 61-92, Part 280:35(e)

Routine Operations and Maintenance

It is the Class B operator's responsibility to ensure that the previous tasks happen on a monthly basis in order to maintain compliance. However, the B operator is only required to visit the facility once a quarter (every 3 months).

R. 61-92, Part 280.35(f)

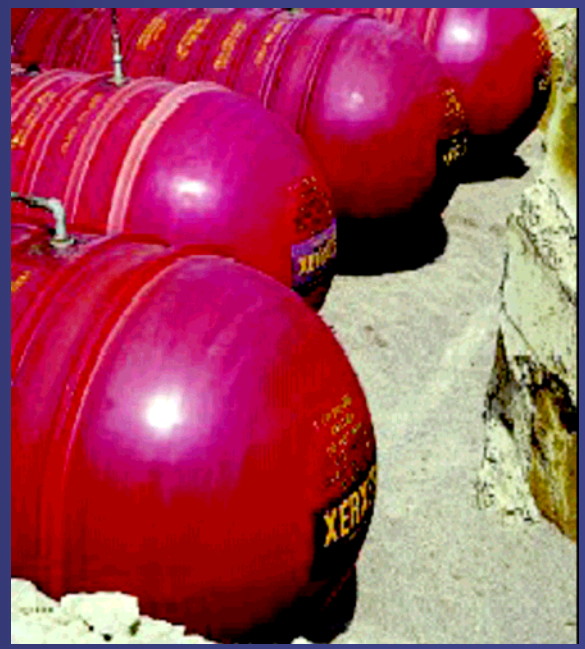
Tank Terminology

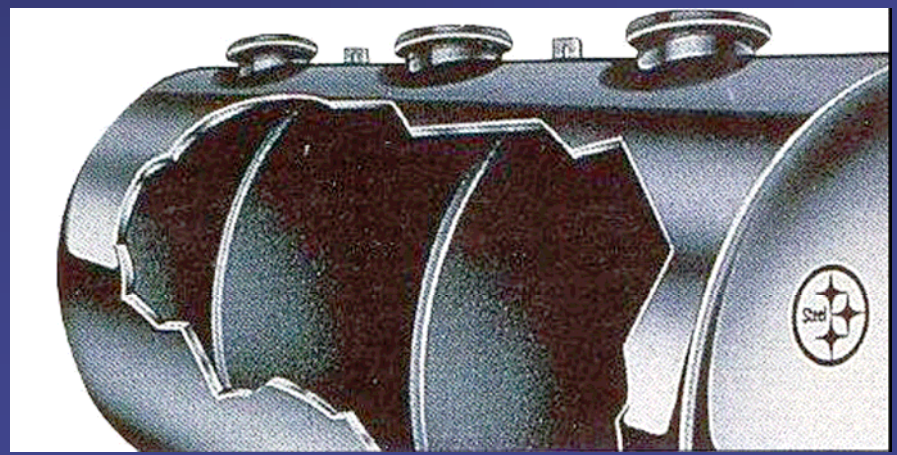


Typical lay-out for an underground storage tank system

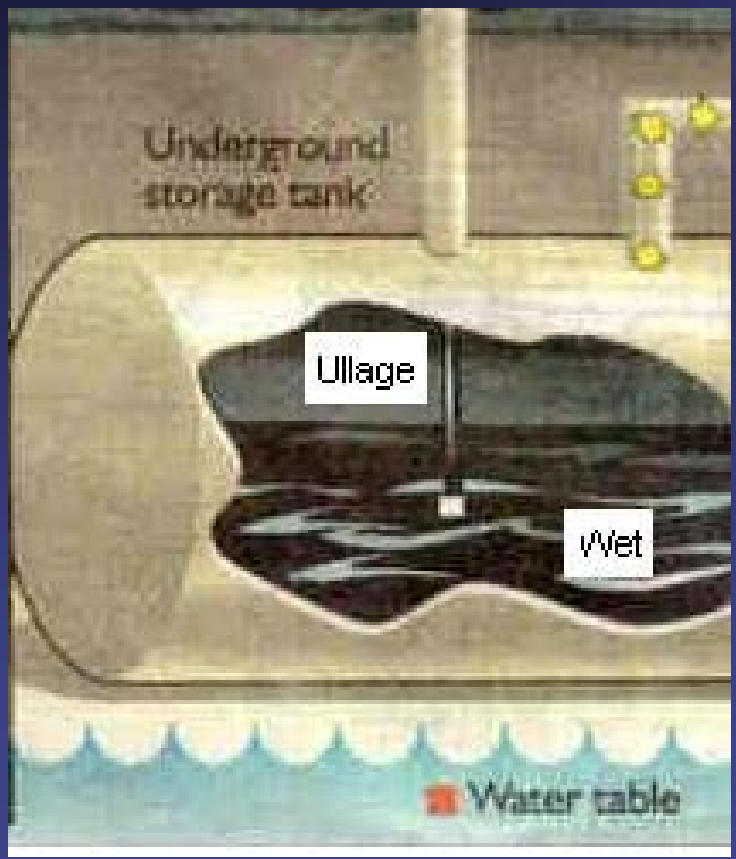
Tank Terminology

Tanks can be single-walled or double-walled, steel, steel clad, jacketed, lined or fiberglass, of varying capacities, and/or compartmented.



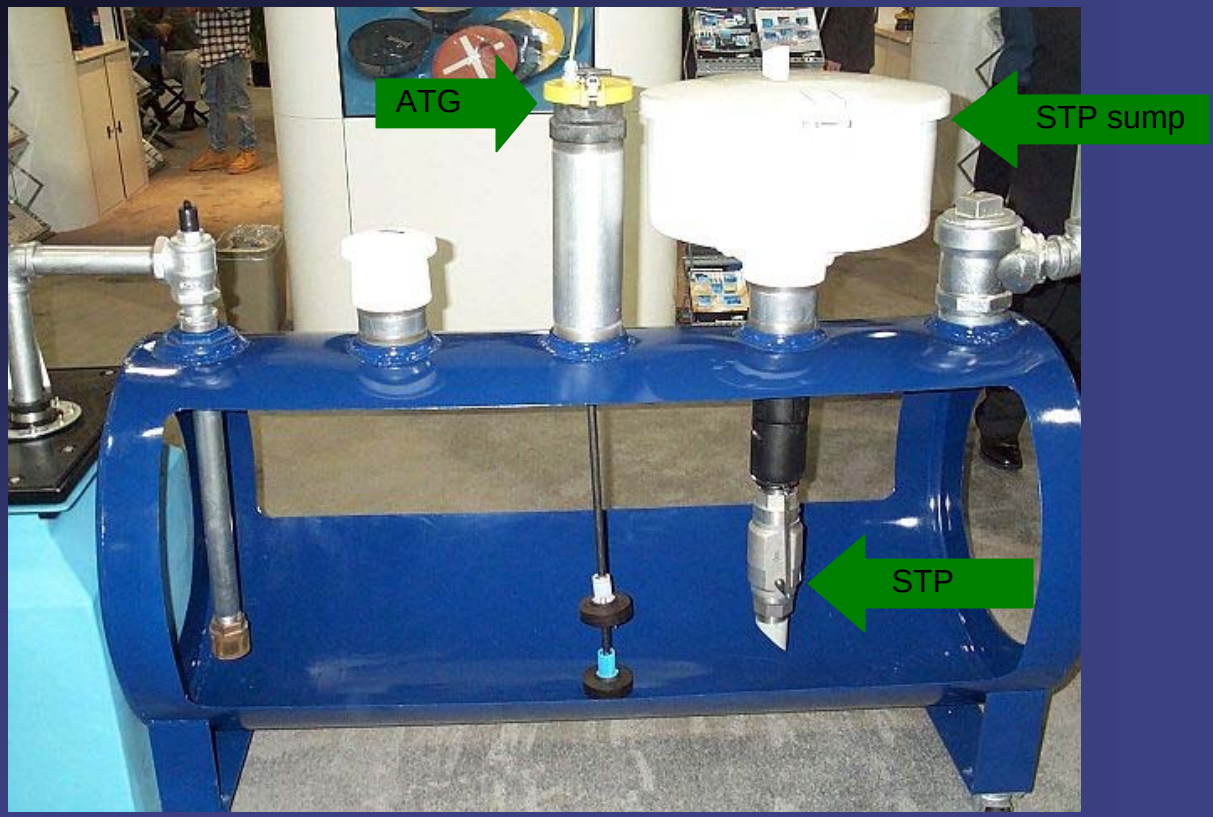


Tank Terminology



The inside of the tank is divided into two parts: the wet part (where fuel is) and the dry part (the ullage). These parts vary in size depending on the amount of fuel in the tank.

Tank Terminology



This is a cutaway of a typical tank system. As you can see there are a few items that penetrate into the tank. However, all that you will be able to see are the parts aboveground such as the electronics portion of the Automatic Tank Gauge and Submersible Turbine Pump.

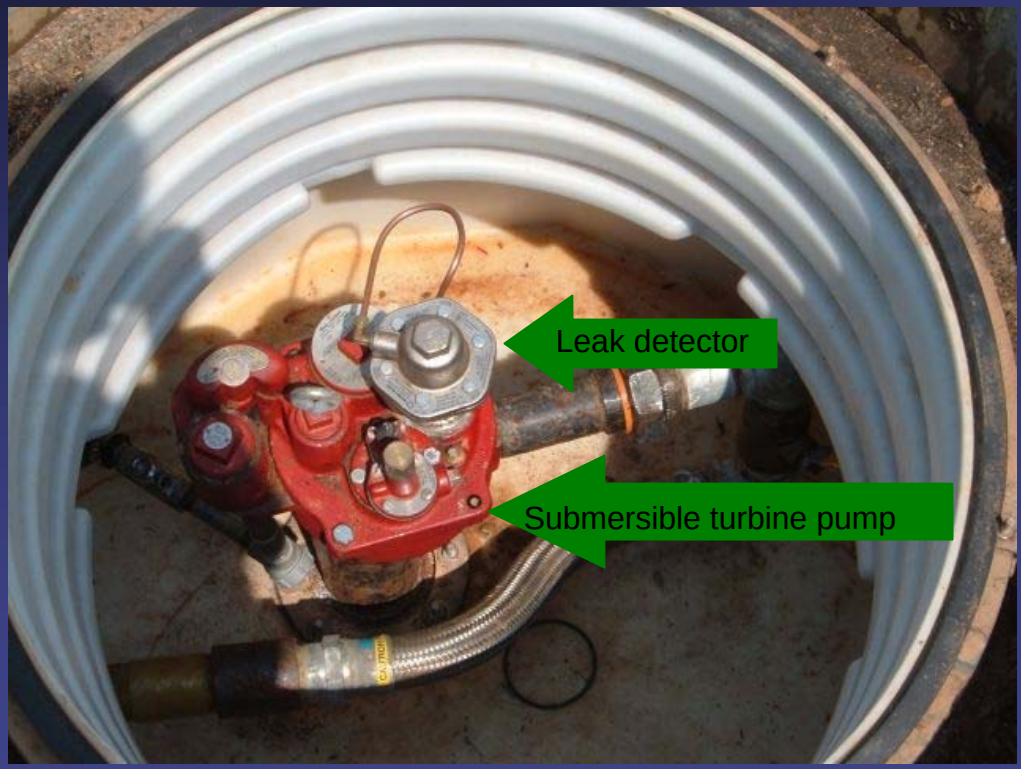
Tank Terminology

Piping can be single-wall or double-wall, made of steel, fiberglass or flexible plastic.

Tank Terminology

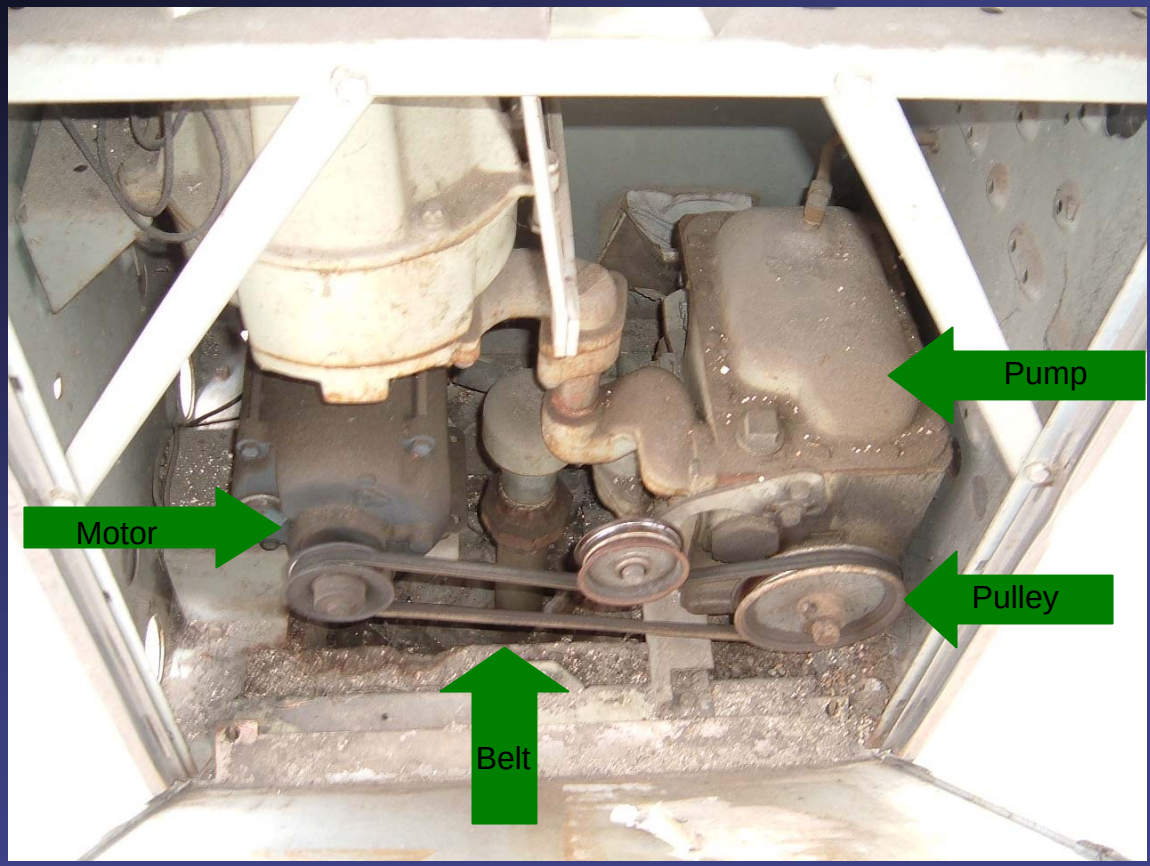
There are two types of piping systems, pressurized and suction. The difference between the two types of piping is the location of the pump.

Tank Terminology



Pressurized piping has what is called a submersible turbine pump (STP). This pump is located inside the tank as close to the bottom as possible. It pushes fuel to the dispenser and is capable of supplying fuel to multiple dispensers. The only portion that can be seen from the top of the tank is the electronics portion (shown here). This is also where a leak detector would be installed.

Tank Terminology



In suction piping systems the pump is located inside the dispenser. (This is why they are sometimes still called pumps.) The fuel is pulled up to the dispenser in this case. A suction system has a motor, a pump, belts, and pulleys inside the dispenser.

Dispensers

Piping leaves the tank and runs to the dispensers which is where fuel is dispensed to automobiles. Once a month, each dispenser should be checked.

Dispensers

- Nozzle

Nozzles with a malfunctioning cut-off could result in a surface spill. Make sure that the equipment works correctly and is not leaking.

Dispensers

- Hose

Hose ruptures cause not only a release aboveground, but also the threat of third party suits due to damages to cars and clothing and possible personal injury. Check the condition of all hoses (is it breaking down due to exposure to the weather or worn from being dragged on the concrete). Most manufacturers say the maximum life for a hose is about 1 year. At high use dispensers, the hoses will need to be changed more frequently.

Dispensers

- Break-away

  The break-away is a connector between the hose and the dispenser. Make sure that the equipment works correctly and is not leaking.

Dispensers

- Swivel

Swivels connect the nozzle to the hose. Make sure that the equipment works correctly and is not leaking.

Dispensers

To inspect the remaining parts of the dispenser, the dispenser skirt (the lower portion) must be removed. Make sure there are no leaks from any part of the interior dispenser equipment.

Dispensers

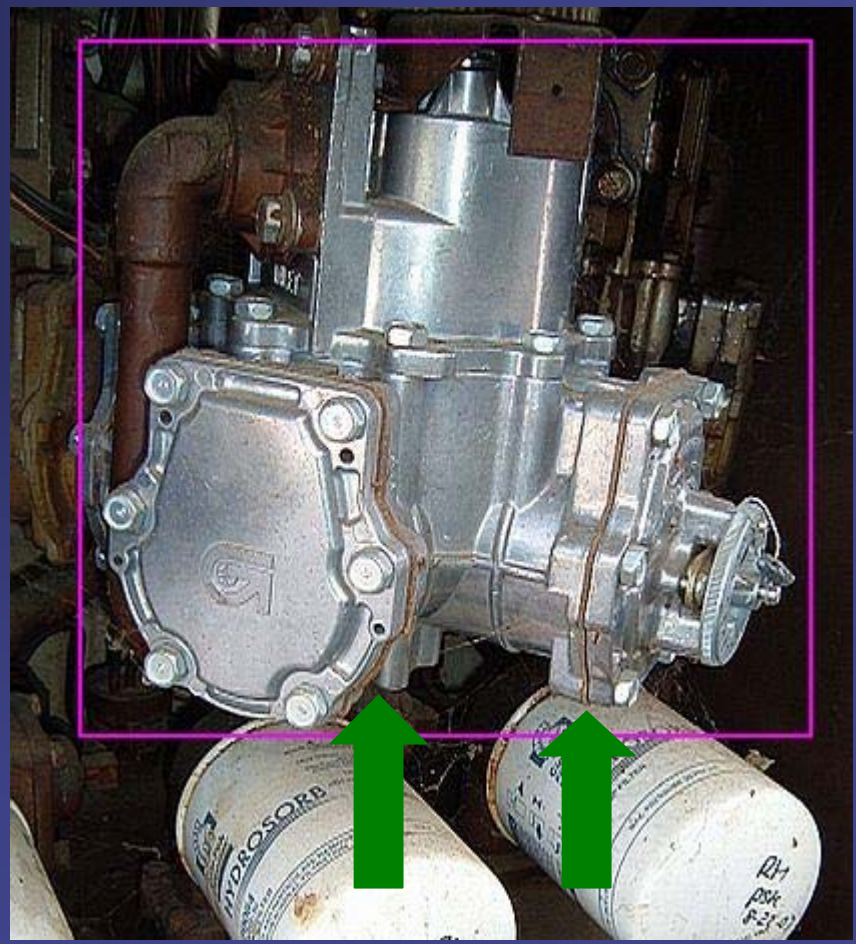
- Filter

Filters at the dispenser trap dirt and water. Filters can rust through and cause a release of fuel. Also, a filter that is installed cross-threaded (not threaded correctly) can leak around the threads. When the filters are changed, the old filter should be disposed of properly, NOT left under the dispenser. Sloppy filter changes (especially under dispensers that do not have containment) can be a continuing source of contamination. Check to make sure the filter is not leaking and fix any that are.

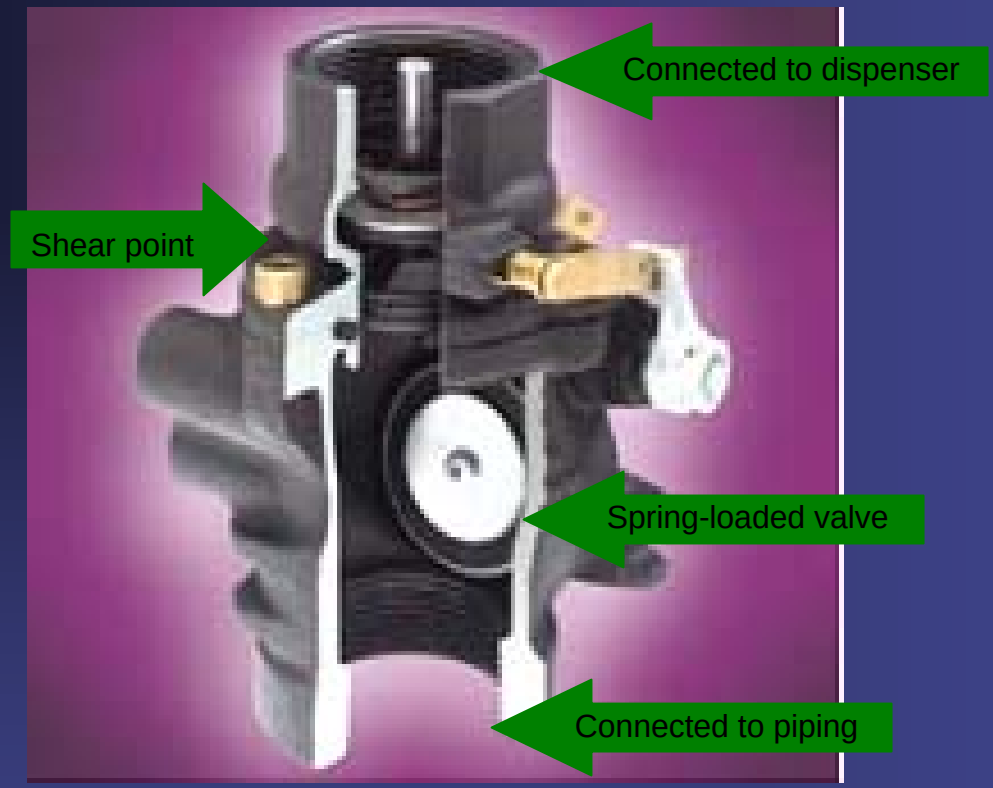
Dispensers

- Meter body

Meter bodies contain gaskets located at the junction points (arrows) that if not installed properly can allow fuel to leak out. Check to make sure that each meter body is not leaking and fix any that are.



Shear Valves



Where pressurized piping comes into the dispenser a shear, or impact, valve is installed. Shear valves are required for all pressurized lines. The shear valve requirement is an effort to stop releases when a dispenser is hit by a vehicle. A shear valve contains at least one valve which is spring-loaded to snap shut. Each shear valve has a shear point which is where it is designed to break upon impact. When a dispenser is hit by a moving object with enough force and the shear valve is anchored correctly, the valve(s) will close and the shear valve will break at the shear point. This creates two capped off parts of the piping that releases no fuel.

Shear Valves

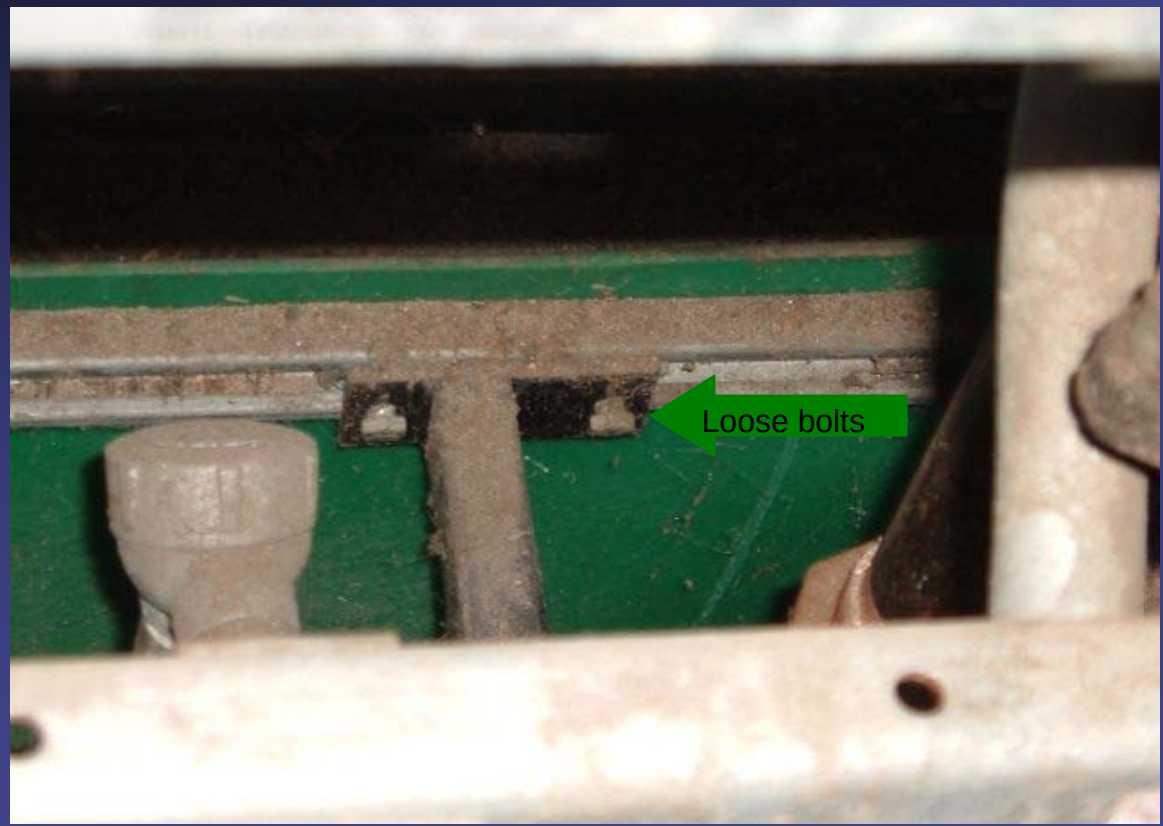
Above are examples of correctly anchored shear valves. The shear point is level with the top of the island, the bolts are tight, the valve is firmly against the stabilizer bar and the stabilizer bar is rigidly anchored to the side walls of the dispenser. The following slides show the places that are of concern when anchoring a shear valve correctly.

Shear Valves

Must be anchored.

Shear Valves

All bolts must be tight.



Shear Valves

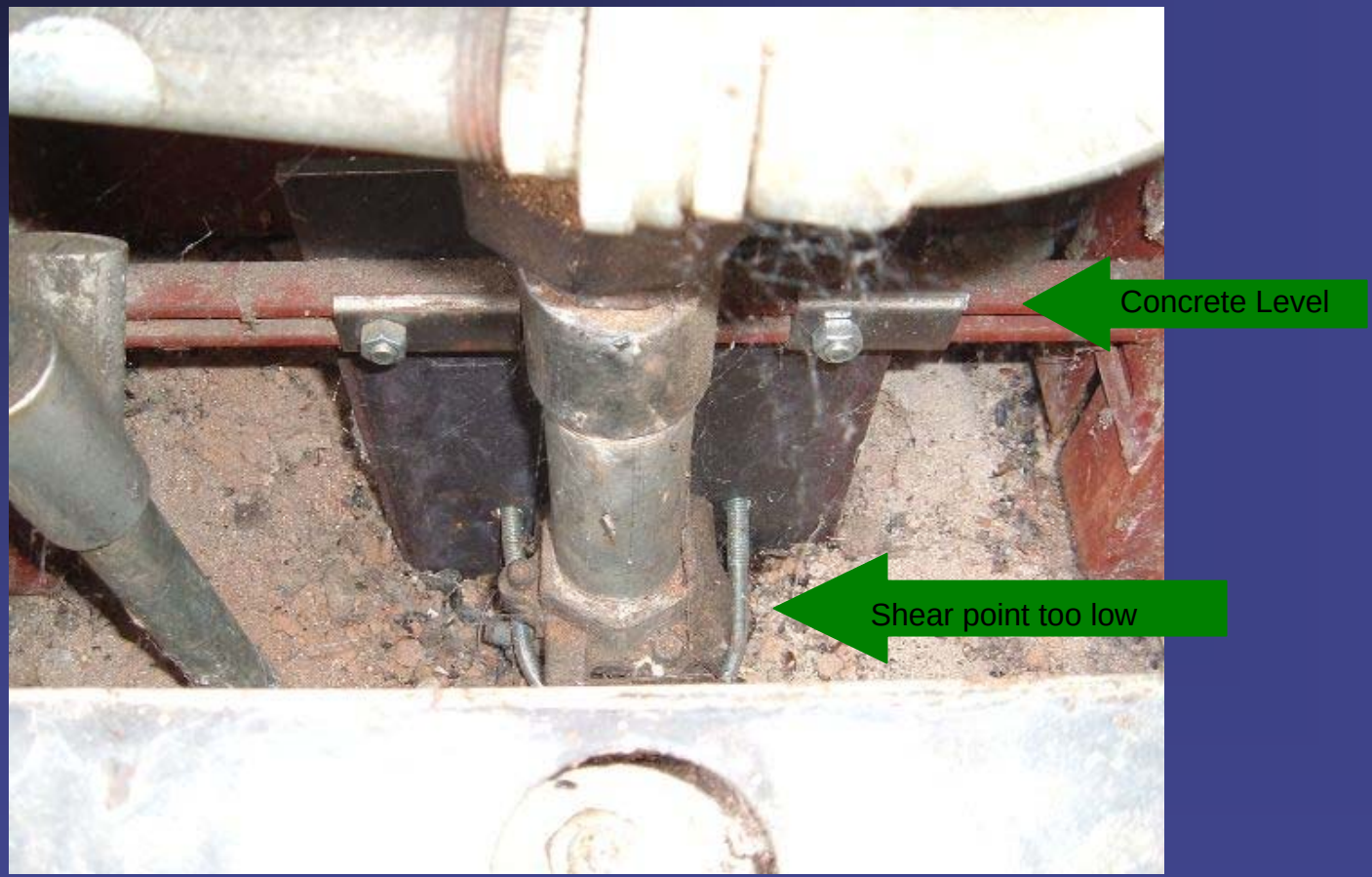
If there is a place for a bolt, it must have a bolt.

Shear Valves

When anchored to a face plate, the face plate must also be securely anchored.

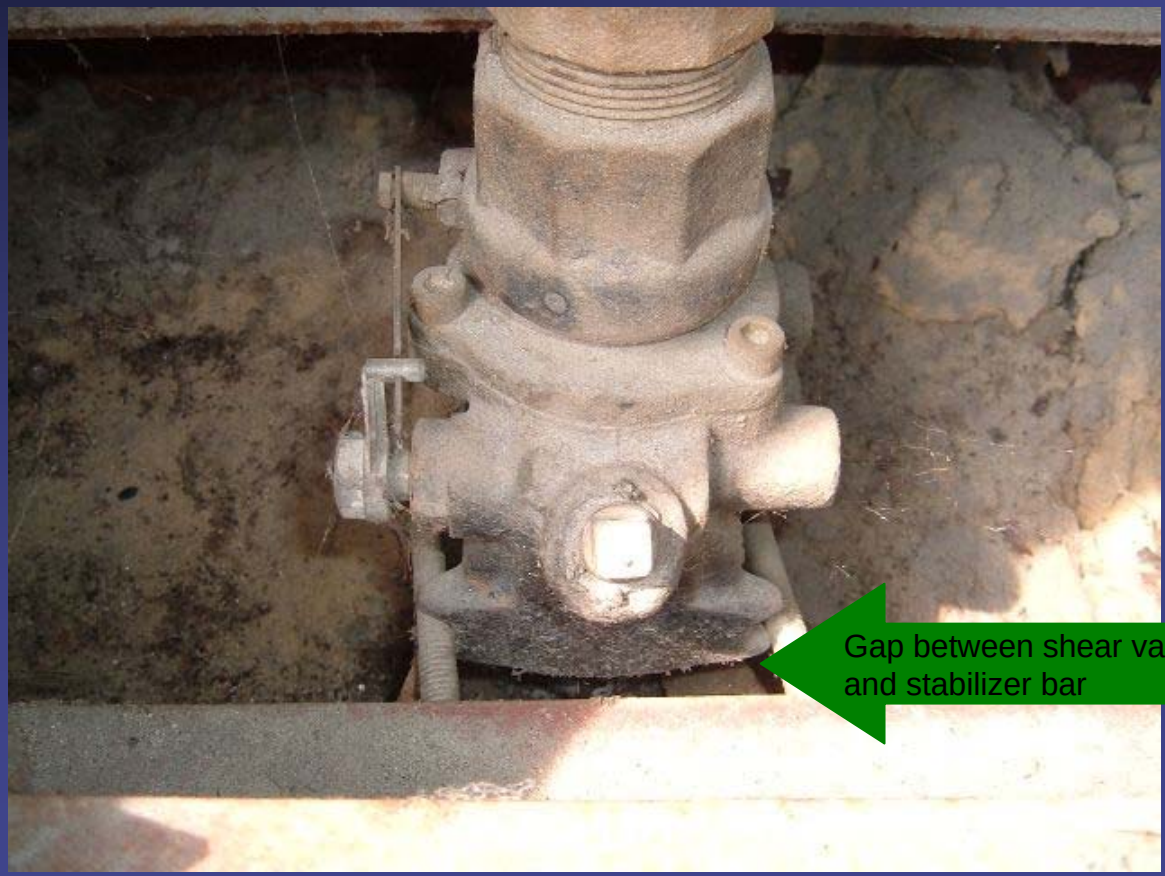
Shear Valves

Shear point should be level with the top of the concrete island.



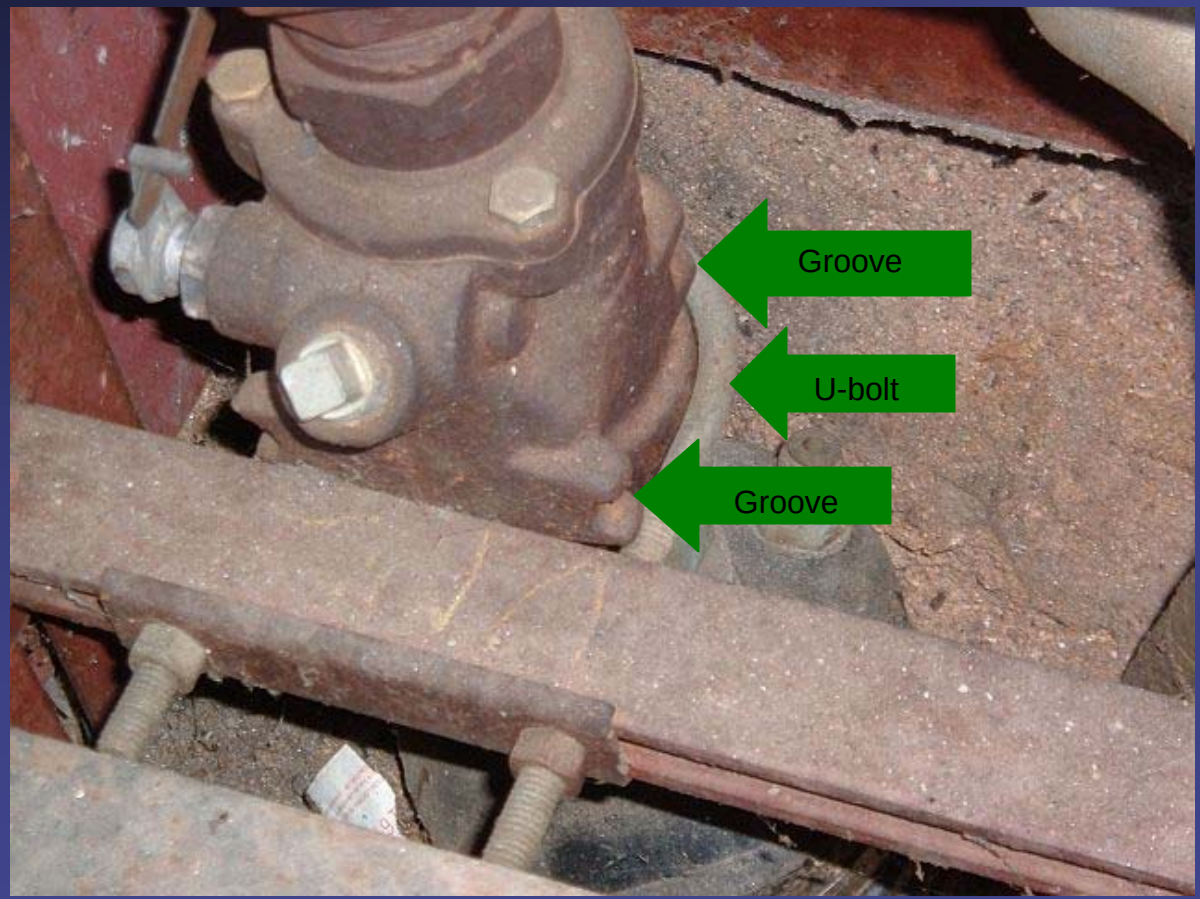
Shear Valves

Shear valve should be flush against the stabilizer bar.



Shear Valves

U-bolt should be placed in the proper grooves.



Shear Valves

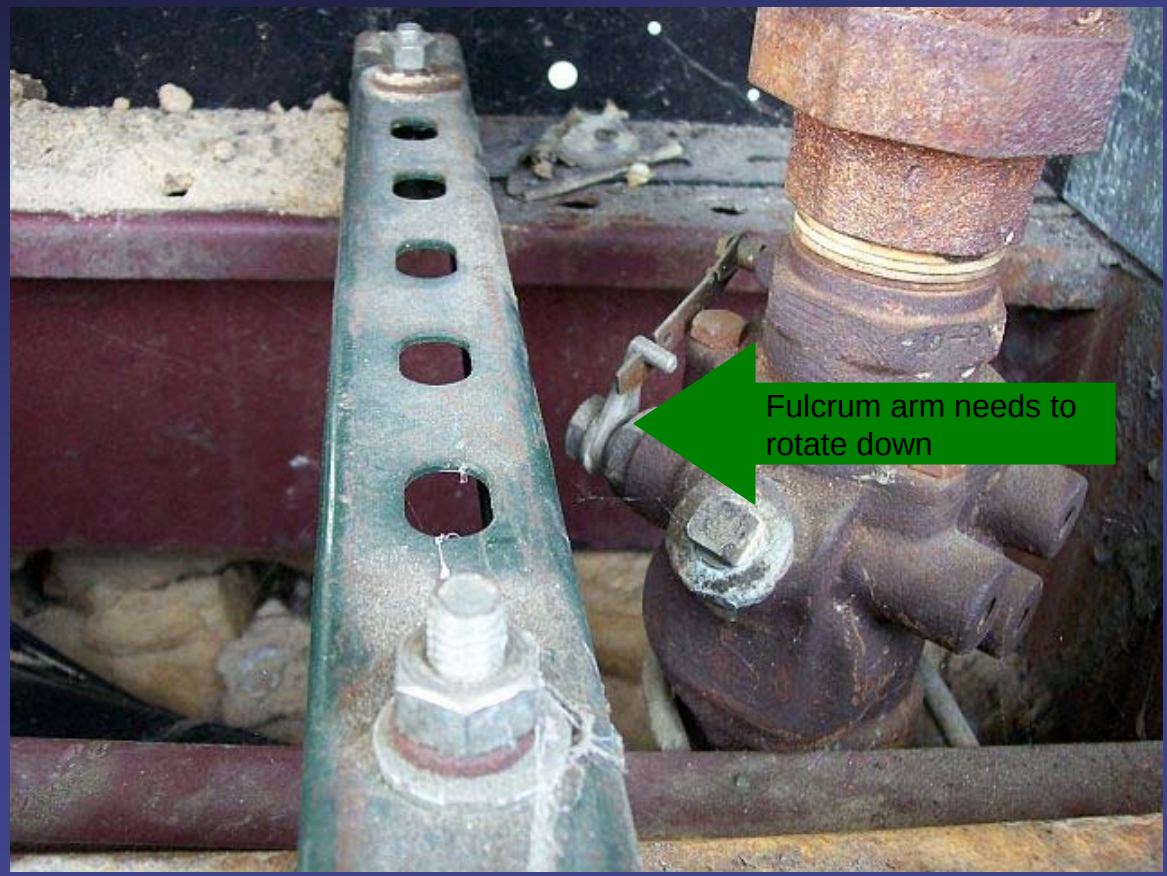
Channel iron should be used if a C-beam cross bar and U-bolt are used.

Shear Valves

Retro-fit bracket should dig into the concrete to be secure

Shear Valves

There should be enough clearance for the fulcrum arm to rotate completely



Shear Valves

These two pictures (showing the same shear valve) are a tame example of what can happen if the shear valve is not anchored correctly. On this particular example, channel iron was not installed as it should have been. The dispenser got hit, putting pressure on the piping. The two sections of the stabilizer bar separated allowing the nuts and washers to pull through. Had this been a more serious hit, the nuts and washer would have pulled all the way through, the shear valve would not have sheared properly, and the piping could have broken causing a release of fuel.

Shear Valves

This picture shows a dispenser that has been completely knocked over and the shear valve (arrow) did not shear at all. The piping was pulled out of the ground and broke below the shear valve. A release and a fire were the results of this shear valve not shearing properly.

What is under all those lids out there in the parking lot?

STP

ATG

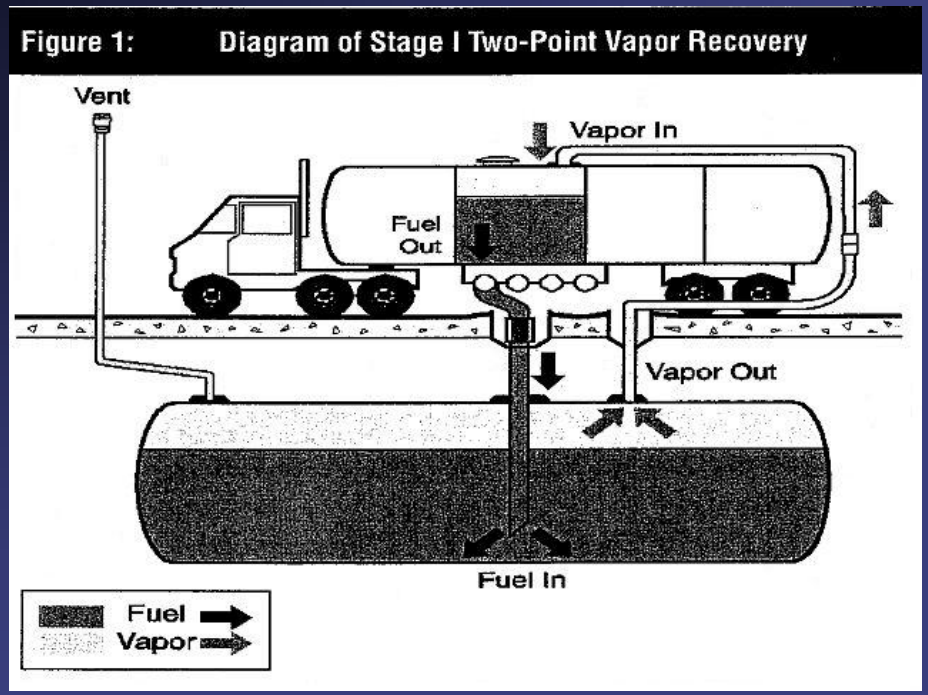
Vapor Recovery

Fill Pipe/Spill Bucket

Spill Buckets

As covered in the spill prevention section previously, spill buckets should be inspected after each and every delivery to remove fuel and/or water and to inspect for cracks, gaps or tears. This picture shows a spill bucket with liquid in it. Also, ensure that the drop tube and the drop tube shut-off valve (if applicable) is present.

Vapor Recovery



In Stage I vapor recovery, vapors in the tank that are created by a delivery and pushed out by incoming fuel are routed through a hose back into the delivery tanker, rather than being vented into the atmosphere.

Vapor Recovery

Vapor Recovery is usually marked by the color orange. Check the area surrounding the vapor recovery monthly to make sure that all equipment is intact.

Other Manway Covers

Interstitial Monitoring port

Stub-out: A port into the tank to add equipment at a later date

Sumps/Pits

Dispenser Sump

Sumps are plastic containment structures that surround piping ends and connections and all corresponding equipment. They can be located at dispensers, submersible turbine pumps, and piping transitions. If no sump is present then the area is called a pit. Sumps keep leaks from piping and/or equipment from reaching the environment. Sumps are also a point for monthly monitoring as this is where sump sensors would be placed and/or visual inspections would take place. They can be used to provide corrosion protection to metal parts by isolating them from the dirt.

Dispenser pit

STP Sump

STP Pit

Sumps/Pits

Metal piping that contains product, including flex connectors and swing joints should not be in contact with the soil or water.

During the monthly system check, look for places where soil has intruded onto metal product piping or where piping that should be dry is now in contact with water. Remove soil and/or water and dispose of it properly.

What Does Disposing of Soil and/or Water Properly Mean??

Disposing of Soil and/or Water Properly

So what does it mean to dispose of properly? Any liquid that is removed from a sump or spill bucket must be treated as if it is contaminated. All stained dirt must be treated as if it is contaminated as well. This means that it cannot be poured on the concrete, down a storm drain or in the grass. The possibly contaminated substances must be cleaned/recycled by a certified environmental recycler. The best way to handle this is to store the substance in a clean, labeled, sealable container (such as a 55-gallon drum) until there is enough to call the environmental company to come pick it up.

Vent Lines

Vent lines allow pressure to fluctuate in the tank. In order to fluctuate, vapors escape out through the vent lines. Make sure that the vent lines are away from all building ventilation areas.

Vent lines that stand by themselves must be at least 12 feet tall. Vent lines attached to buildings must extend at least 3 feet above the roof. On new installations, the vent lines are frequently carried up through the canopy supports and vent above the canopy. These vent lines must extend at least 5 feet above the top of the canopy.

Vent Lines

All vent lines must have a rain cap installed on each line. It prevents rainwater from entering the tank while still allowing vapors to escape. Check to make sure the rain cap is there.

Vent Lines

Right now, new facilities that expect to sell more than 100,000 gallons of gasoline a month must have pressure/vacuum vent valves. By 2011, vent lines at existing facilities that dispense 100,000 gallons or more of gasoline each month must also be equipped with pressure/vacuum vent valves. (Diesel and kerosene tanks are not included in this requirement.)

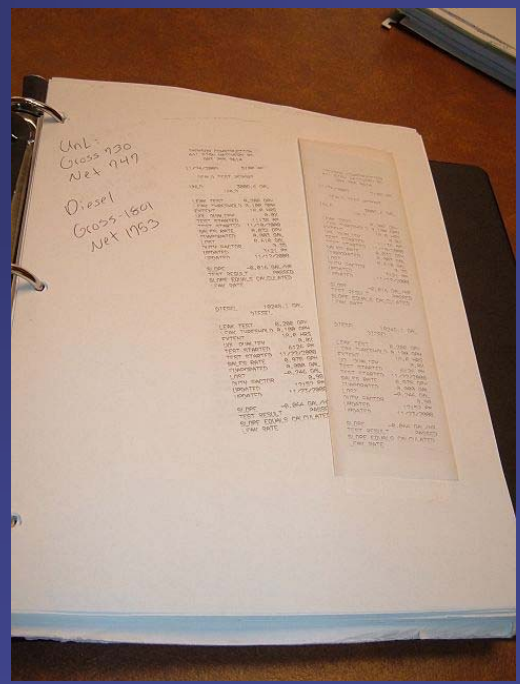
Vent Lines

Monthly inspections should include verifying that the integrity of the vent lines has not been compromised (hit by a vehicle or pulled away from the supports). If the lines have been damaged, they should be repaired so that they do not allow water to enter the tank. In several instances, water entered a tank in such large amounts that it caused water to be pushed out of the tank-top risers (along with fuel). Vent lines should also not allow vapors to be vented at ground-level. No additional monitoring or corrosion protection is required for vent lines.

Release Detection Records

Ensure that the monthly requirement for release detection is met and that the record for each month is kept for at least 12 months. (If there are testing requirements, make sure these are met as well.)

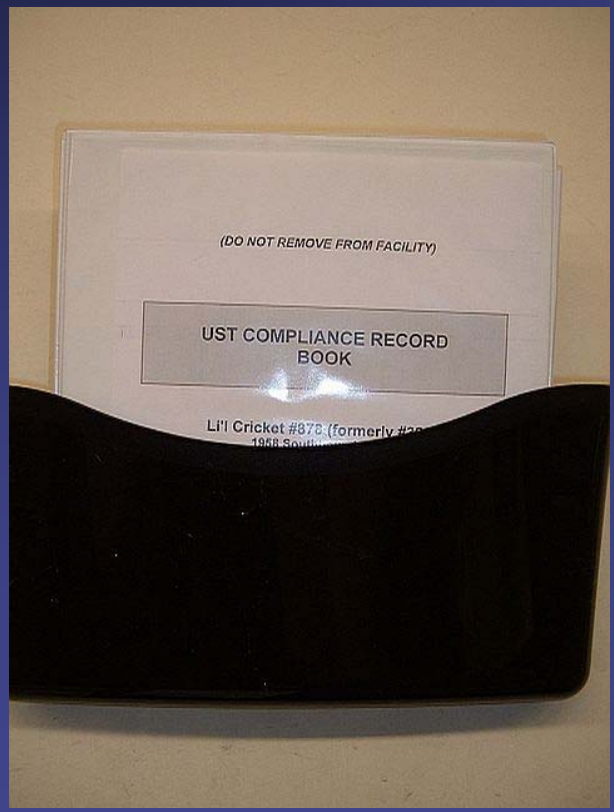
This is not adequate record keeping!



This makes for easy, accurate record keeping!

Release Detection Records

Records do not have to be kept at the facility. However, they have to be made available onsite at the facility at the time of the inspection (or any other time as requested).



Release Detection Records

Class B Operators can make sure all of these things occur without having to visit the facility monthly. The requirement is that Class B operators visit each facility they are designated for at least once a quarter (every 3 months). Simply calling the facility once a month and getting the right answers to the right questions will ensure that adequate monthly monitoring takes place.